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NASA TECH BRIEF

Rate of Heat Extraction Controller for Environmental Control

The problem:

To regulate the temperature automatically within a watercooled environmental control suit.

The solution:

An automatic control device measures a physiological parameter related to heat production and conditions it to control the heat removal capacity of the suit.

How it's done:

A metabolic rate monitor uses a polarographic cell to measure the partial pressure of oxygen in exhaled gas, and generates a signal proportional to the amount of oxygen consumed.

The oxygen consumption rate is directly related to the heat production rate of the worker enclosed in the suit. Hence, this signal is used to control the efficiency of a thermoelectric cooling system. Changes in the temperature of the water input to the suit cooling coil produce changes in its heat removal capability and maintain a constant temperature within the suit.

This device should find application in the areas of thermal control and life support systems.

Note:

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